

Clinicoanatomical Problems

Clinicoanatomical Problems — Pericardium, Heart, and Foetal Circulation

1. Cardiac Tamponade

- **Cause:** Rapid accumulation of fluid (blood, pus, or effusion) in the **pericardial cavity**.
 - **Effect:** Compression of the heart ? prevents full ventricular filling ? decreased cardiac output.
 - **Clinical Signs:**
 - Distended neck veins (? venous pressure)
 - Hypotension
 - Muffled heart sounds (**Beck's triad**)
 - **Treatment:** Emergency **pericardiocentesis** (needle inserted at left 5th intercostal space near sternum).
-

2. Pericarditis

- **Definition:** Inflammation of the pericardium (viral, bacterial, or post-MI).
 - **Symptoms:** Sharp, substernal pain relieved by leaning forward.
 - **Finding:** **Pericardial friction rub** on auscultation due to roughened pericardial layers.
-

3. Myocardial Infarction (MI)

- **Cause:** Complete blockage of a coronary artery (most often **LAD**).
 - **Pathophysiology:** Ischemia ? necrosis of myocardial tissue.
 - **ECG Changes:** ST elevation, pathological Q wave, inverted T wave.
 - **Clinical Feature:** Severe crushing chest pain radiating to **left arm, neck, or jaw**.
-

4. Angina Pectoris

- **Cause:** Transient myocardial ischemia without necrosis due to coronary artery narrowing.
 - **Symptoms:** Tightness or heaviness in chest on exertion, relieved by **rest or nitrates**.
-

5. Coronary Artery Dominance and MI

- **Right dominance:** RCA supplies posterior septum ? occlusion causes **inferior wall infarction**.
 - **Left dominance:** LCX supplies posterior septum ? infarction may involve most of **left ventricle**.
 - **Co-dominance:** Lesser extent of infarction due to collateral flow.
-

6. Atrial Septal Defect (ASD)

- **Cause:** Incomplete closure of **foramen ovale** due to failure of **septum primum and secundum fusion**.

- **Effect:** Left-to-right shunt ? right atrial and ventricular dilation.
 - **Clinical Sign:** Fixed splitting of **second heart sound (S?)**.
-

7. Ventricular Septal Defect (VSD)

- **Cause:** Defective **membranous part** of interventricular septum (commonest congenital cardiac defect).
 - **Effect:** Left-to-right shunt ? pulmonary hypertension ? right ventricular hypertrophy.
 - **Complication:** Eisenmenger's syndrome (reversal of shunt ? cyanosis).
-

8. Patent Ductus Arteriosus (PDA)

- **Cause:** Persistence of **ductus arteriosus** after birth.
 - **Effect:** Blood flows from **aorta ? pulmonary artery** (left-to-right shunt).
 - **Clinical Feature:** Continuous “**machinery**” **murmur** at left 2nd intercostal space.
 - **Treatment:** Indomethacin (to close PDA) or surgical ligation.
-

9. Tetralogy of Fallot

- **Components (PROV):**
 - **P** – Pulmonary stenosis
 - **R** – Right ventricular hypertrophy
-

- **O** – Overriding aorta
 - **V** – Ventricular septal defect
 - **Effect:** Right-to-left shunt ? **cyanosis** and **clubbing**.
 - **Clinical Sign:** Squatting improves symptoms by increasing systemic resistance.
-

10. Transposition of Great Arteries

- **Cause:** Failure of spiral rotation of **aorticopulmonary septum**.
 - **Effect:** Aorta arises from right ventricle; pulmonary trunk from left ventricle.
 - **Consequence:** Parallel circulation incompatible with life unless shunts (ASD, PDA) persist.
-

11. Coarctation of Aorta

- **Cause:** Constriction of aortic lumen near ductus arteriosus.
- **Types:**
 - *Pre-ductal:* Ductus arteriosus remains patent (in infancy).
 - *Post-ductal:* Collateral circulation via intercostal arteries (adult type).
- **Clinical Sign:**
 - Weak femoral pulses

- Radio-femoral delay
 - Rib notching on X-ray (due to enlarged intercostal arteries).
-

12. Referred Cardiac Pain

- **Mechanism:** Visceral pain from myocardium transmitted via **T1–T5 spinal nerves**.
 - **Perception:** Left chest, shoulder, medial arm, and neck — same dermatomes as cardiac afferents.
-

13. Arrhythmias

- **Cause:** Disturbances in conduction pathway (SA, AV, or Purkinje system).
 - **Types:**
 - Tachycardia (? rate)
 - Bradycardia (? rate)
 - Heart block (AV conduction failure)
 - **Treatment:** Pacemaker for complete block.
-

14. Cyanotic vs. Acyanotic Heart Disease

- **Cyanotic:** Right-to-left shunt ? decreased oxygenation (e.g., Tetralogy, Transposition).
 - **Acyanotic:** Left-to-right shunt ? pulmonary overload (e.g., ASD, VSD, PDA).
-

15. Pericardial Effusion after MI

- **Mechanism:** Post-infarction inflammation (**Dressler's syndrome**) ? pericarditis ? fluid accumulation.
- **Symptoms:** Low-grade fever, chest pain, friction rub, pericardial thickening.

Additional Clinicoanatomical Problems — Pericardium, Heart, and Foetal Circulation

16. Constrictive Pericarditis

- **Cause:** Chronic inflammation leading to **fibrosis and calcification** of pericardium (e.g., post-tubercular).
 - **Effect:** Rigid pericardium restricts diastolic filling ? **right-sided heart failure**.
 - **Clinical Features:**
 - Elevated jugular venous pressure (JVP)
 - Ascites and pedal edema
 - Kussmaul's sign (rise of JVP during inspiration)
 - **Treatment: Pericardiectomy** (surgical removal of pericardium).
-

17. Endocarditis

- **Cause:** Infection of **endocardial surface** (commonly valves) by bacteria like *Streptococcus viridans*.

- **Types:**

- *Acute*: Rapid and destructive (*Staph. aureus*).
- *Subacute*: Slow and less aggressive.

- **Clinical Features:**

- Fever, murmur, splinter hemorrhages, Osler's nodes.
- Commonly affects **mitral valve**.

- **Complication:** Embolic infarcts in brain, spleen, or kidneys.

18. Rheumatic Heart Disease

- **Cause:** Autoimmune reaction to *Streptococcus pyogenes* throat infection.
 - **Result:** Chronic inflammation and scarring of heart valves (especially **mitral valve**).
 - **Clinical Features:**
 - Mitral stenosis or regurgitation
 - Opening snap and diastolic murmur
 - "Fish-mouth" deformity of mitral orifice.
-

19. Mitral Valve Prolapse (MVP)

- **Cause:** Redundant valve leaflets bulge into left atrium during systole.

- **Clinical Features:**

- Mid-systolic click followed by late systolic murmur.
- May cause palpitations or endocarditis.

- **Common in:** Young women with connective tissue disorders (e.g., Marfan syndrome).
-

20. Aortic Stenosis

- **Cause:** Calcification of aortic valve cusps in elderly or congenital bicuspid valve.
 - **Effect:** Left ventricular hypertrophy due to pressure overload.
 - **Symptoms:** Dyspnea, angina, syncope on exertion.
 - **Murmur:** Harsh systolic murmur radiating to carotids.
-

21. Aortic Regurgitation

- **Cause:** Incomplete closure of aortic valve (post-rheumatic, infective endocarditis).
 - **Effect:** Backflow of blood into left ventricle ? dilatation and hypertrophy.
 - **Clinical Signs:**
 - “Water hammer” pulse (Corrigan’s pulse).
 - Early diastolic murmur.
-

22. Mitral Stenosis

- **Cause:** Post-rheumatic fibrosis causing narrowing of mitral orifice.
 - **Effect:** Left atrial pressure ↑ ↑ pulmonary congestion ↑ right heart failure.
 - **Symptoms:** Dyspnea, hemoptysis, orthopnea.
 - **Murmur:** Diastolic, low-pitched “rumbling” murmur at apex.
-

23. Myocarditis

- **Cause:** Viral infection (e.g., Coxsackie B virus).
 - **Effect:** Inflammation of myocardium → reduced contractility → heart failure.
 - **Clinical Features:** Fever, palpitations, arrhythmias, chest pain.
-

24. Congestive Cardiac Failure (CCF)

- **Left-sided failure:** Pulmonary congestion, dyspnea, orthopnea.
 - **Right-sided failure:** Systemic venous congestion, ascites, ankle edema.
 - **Common Causes:**
 - Hypertension
 - Ischemic heart disease
 - Valvular disorders
-

25. Sudden Cardiac Death (SCD)

- **Mechanism:** Fatal arrhythmia (ventricular fibrillation) often following acute myocardial ischemia.
 - **Common Cause:** Coronary artery thrombosis or severe atherosclerosis.
 - **Prevention:** Early reperfusion therapy and defibrillation.
-

26. Coarctation of Aorta (Adult Type)

- **Mechanism:** Constriction distal to origin of left subclavian artery.
 - **Features:**
 - Hypertension in upper limbs
 - Weak pulses in lower limbs
 - “Rib notching” on X-ray (collateral flow via intercostal arteries).
-

27. Dextrocardia

- **Definition:** Heart positioned on right side due to **reverse rotation** during embryogenesis.
 - **Variants:**
 - *Isolated:* Only heart is reversed.
 - *With situs inversus:* All organs reversed.
 - **Clinical Relevance:** Often asymptomatic unless associated with other defects (Kartagener syndrome).
-

28. Eisenmenger's Syndrome

- **Pathogenesis:** Long-standing left-to-right shunt (ASD, VSD, PDA) ? pulmonary hypertension ? reversal to right-to-left shunt.
 - **Result:** Cyanosis, clubbing, and polycythemia.
-

29. Persistent Truncus Arteriosus

- **Cause:** Failure of aorticopulmonary septum to form.
 - **Result:** Common arterial trunk supplying both systemic and pulmonary circulations ? cyanosis.
-

30. Double Outlet Right Ventricle

- **Anomaly:** Both aorta and pulmonary trunk arise from right ventricle.
 - **Effect:** Severe cyanosis; survival depends on VSD allowing mixing of blood.
-

31. Sinus Venosus Defect

- **Cause:** Abnormal communication between right pulmonary vein and right atrium.
 - **Result:** Oxygenated blood enters right atrium ? mild cyanosis and dyspnea.
-

32. Persistent Left Superior Vena Cava

- **Cause:** Failure of left cardinal vein to regress.

- **Drainage:** Opens into **coronary sinus** instead of right atrium.
 - **Clinical Importance:** Important during **central venous catheterization** or **pacemaker insertion**.
-

33. Congenital Absence of Pericardium

- **Rare anomaly** due to faulty pleuropericardial membrane fusion.
 - **Clinical Presentation:** Asymptomatic or with displaced heart shadow on X-ray.
 - **Risk:** Cardiac herniation in partial defects.
-

34. Cardiac Hypertrophy

- **Cause:** Pressure or volume overload (hypertension, valvular disease).
 - **Types:**
 - *Concentric:* Due to pressure overload (e.g., aortic stenosis).
 - *Eccentric:* Due to volume overload (e.g., aortic regurgitation).
 - **Complication:** Decreased compliance and arrhythmia risk.
-

35. Coronary Artery Spasm (Variant or Prinzmetal Angina)

- **Mechanism:** Transient vasospasm of coronary artery ? ischemia without atherosclerosis.
 - **Feature:** Chest pain at rest with **ST elevation** on ECG, relieved by nitrates.
-